

**Bay Area Solar Photovoltaic Ordinance
Draft Model Ordinance**

**MANDATORY REQUIREMENTS FOR THE INSTALLATION OF
PHOTOVOLTAIC SOLAR ENERGY SYSTEMS**

**Note: The scope of this model ordinance is based on a cost-effectiveness study and is consistent with State requirements for local ordinances that exceed the State Energy Code. Some of the text will need to be modified to reflect local conditions as noted in [BRACKETS]. Additionally, local agencies may modify other parts of the text to the extent that the requirements are consistent with the cost-effectiveness study and comport with State law and regulations governing local reach codes.
See the Toolkit for more information and instructions.**

FINDINGS [REQUIRED: EXAMPLE FINDINGS. MODIFY AS NEEDED TO REFLECT LOCAL CONDITIONS/FINDINGS]

- WHEREAS, Public Resources Code Section 25402.1(h)(2) allows more stringent local amendments to the energy conservation provisions in the California Energy Code; and
- WHEREAS, the proposed amendments will result in designs that consume less energy than they would under the existing State Energy Code; and
- WHEREAS there is no possibility that the proposed amendments will have a significant negative effect on the environment and are therefore categorically exempt from the requirements of the California Environmental Quality Act; and
- WHEREAS, the proposed amendments have been determined to provide positive net benefits to new single family and low-rise multifamily residential construction within the [**Jurisdiction**] based on a study of the specific requirements as they apply to the [**Jurisdiction's**] particular climate zone; and
- WHEREAS, the Council expressly declares that the following amendments to the building code are reasonably necessary because of local [**INCLUDE ANY OR ALL THAT APPLY: climatic, topological, and geological**] conditions; and
- WHEREAS, failure to address and significantly reduce greenhouse gas (GHG) emissions could result in rises in sea level, including in the San Francisco Bay, that could put at risk [**Jurisdiction**] homes and businesses, public facilities, and [**CITE ANY PARTICULAR INFRASTRUCTURE AT RISK**]; and

- WHEREAS, due to changes in rainfall patterns expected with climate change, the **[Jurisdiction]** is likely to be subject to more severe weather events, including droughts as well as more intense storms that increase the risks of wildfire, erosion, overland local flooding and landslides; and
- WHEREAS, it is expected that climate change will result in more severe and frequent extreme heat events, intensifying local heat islands and putting vulnerable populations at health risk; and

[OPTIONAL: EXAMPLES OF OPTIONAL LOCAL FINDINGS]

- WHEREAS, the **[Jurisdiction]** is committed to reducing greenhouse gas emissions in accordance with the United States’ original commitment to the Paris Climate Accord; and
- WHEREAS, the State of California enacted Senate Bill (SB) 32 to require greenhouse gas emissions to be reduced to 40 percent below 1990 levels by 2030; and
- WHEREAS, the **[Jurisdiction]** Climate Action Plan recommends **[CITE PLAN ELEMENTS THAT RELATE TO THE PROPOSED ORDINANCE]**; and
- WHEREAS, solar energy and highly efficient buildings enhance the public health, welfare and resiliency of the **[Jurisdiction]** by promoting the environmental and economic health through the design, construction, maintenance and operation of buildings; and
- WHEREAS, the solar energy sector has added tens of thousands of jobs to the Bay Area and will continue to expand local workforce development opportunities; and
- WHEREAS, it is reasonably necessary to require building owners to produce renewable, low-carbon electricity and to reduce the energy consumed through efficient design to reduce pollution, benefit biodiversity, improve resilience to climate change by reducing the global warming effects of energy production and consumption; and
- WHEREAS, the California Energy Code, 2016 Edition, Title 24, Part 6 of the California Code of Regulations was adopted by the **[Jurisdiction]** with local amendments on **[DATE]** under Ordinance **[NUMBER]**; and
- WHEREAS, the requirements specified in this ordinance were **[CITE ANY PUBLIC PROCESS, COMMISSION OR SUBCOMMITTEE REVIEW/APPROVALS]**.

- NOW, THEREFORE, BE IT RESOLVED that the [**Jurisdiction**] does ordain as follows:

(A) DEFINITIONS

BUILDING OFFICIAL is the officer or other designated authority charged with the administration and enforcement of California Code of Regulations Title 24, or a duly authorized representative.

CALGreen is the 2016 California Green Building Standards, California Code of Regulations, Title 24, Part 11.

COVERED STRUCTURE includes any Newly Constructed Structure of three stories or less of Occupancy Group R-1, R-2, and R-3 where occupants are primarily permanent in nature. This excludes any buildings classified as Group R-2.1, R-3.1, R-4 and I, specifically

- Adult facilities that provide accommodations for six or fewer persons of any age for less than 24-hours. Licensing categories that may use this classification include, but are not limited to Adult Day Programs.
- Child care facilities that provide accommodations for six or fewer persons of any age for less than 24-hours. Licensing categories that may use this classification include, but are not limited to:
 - Day-care Center for Mildly Ill Children, Infant Care Center and School Age Child Day-care Center.
 - Family Day-care Homes that provide accommodations for 14 or fewer children, in the provider's own home for less than 24-hours.
- Congregate living facilities or congregate residences with 16 or fewer persons.

MODULE NAMEPLATE OUTPUT is the nameplate DC power rating of the solar module, measured under a panel manufacturer's Standard Test Conditions.

NEWLY CONSTRUCTED STRUCTURE is a building that has never been used or occupied for any purpose.

STEEP-SLOPED ROOF has a ratio of rise to run of greater than 2:12.

TIME DEPENDENT VALUATION or TDV is the time varying energy caused to be used by the building, specifically as defined in CALGreen. The concept of TDV is that energy savings should be valued differently depending on which hours of the day, and

over an annual timeframe, the savings occur, to better reflect the actual costs of energy to consumers, to the utility system, and to society.

(B) PURPOSE AND INTENT

It is the purpose and intent of this Section to provide standards for builders and developers of new residential buildings of three stories or fewer to improve energy performance by installing solar photovoltaic (PV) systems and by designing for high efficiency. This will achieve energy savings and increase deployment of renewable energy technology such that 80% of the buildings' annual electric requirements are to be provided by on-site solar power.

(C) REQUIREMENT

Construction of any Covered Structure for which permit applications are submitted on or after the Effective Date of this Ordinance shall:

- (1) Be designed to include the green building measures specified as mandatory under CALGreen section [4.201] and the efficiency requirements of section [A4.203.1.1].
- (2) Have a solar photovoltaic system installed that meets the minimum system requirement. The minimum system requirement shall be satisfied using either of two methods, prescriptive or performance:
 - a. Prescriptive Method. The method shall be applicable only to buildings with less than 4,500 square feet of conditioned floor space. The nameplate system size shall be calculated as the sum of each solar Module's Nameplate Output. The minimum capacity shall be:

Table 1: *Minimum Nameplate System Size (kW_{DC}) Required*

[SAMPLE IS FOR CLIMATE ZONE 12, INSERT VALUES FOR LOCAL CLIMATE ZONE(S) FROM TABLE 1 IN THE COST EFFECTIVENESS STUDY]

Conditioned Space (ft ²)	Minimum kW (DC) Required
Less than 1000	1.5
1000 – 1499	1.9
1500 – 1999	2.3
2000 – 2499	2.7
2500 – 2999	3.1
3000 – 3499	3.4
3500 – 3999	3.8
4000 – 4499	4.2

- b. Performance Method. Install a solar photovoltaic system sized to meet the minimum percentage of the building’s total TDV energy on an annual basis, as defined in Table 2. The system sizing requirement shall be based upon total building TDV energy use including both conditioned and unconditioned space and calculated using modeling software or other methods approved by the Building Official. Buildings with 4,500 square feet or more of conditioned floor area must use the performance method.

Buildings with less than 4,500 square feet of conditioned floor space may use the performance method or the prescriptive method.

Table 2: *Minimum Percent Reduction of Total Annual TDV Energy Use by Bay Area Climate Zone*

[DELETE CLIMATE ZONES THAT ARE NOT WITHIN THE JURISDICTION. IF THERE ARE MULTIPLE CLIMATE ZONES IN THE JURISDICTION, SEE THE INSTRUCTIONS]

Climate Zone	PV % Total TDV
CZs 1, 2, 4, or 12	45%
CZ 3	55%

(3) Have a solar photovoltaic system installed that:

- a. Is interconnected with at least one electric service meter that services the building.

- b. Is oriented between 110 degrees and 270 degrees of true north, for fixed orientation systems located on a Steep-Sloped Roof only. There is no tilt requirement for the solar photovoltaic system.
 - c. Meets the minimal shading criterion. The minimal shading criterion requires that no obstruction is closer than a distance (“D”) of twice the height (“H”) as it extends above the PV array. “D” is the horizontal distance from the closest point on the array to the vertical projection from the point on the obstruction. “H” is the height of the shading obstruction point above the horizontal projection to the closest point on the array. Any obstruction located north of all points on the array need not be considered as shading obstructions. When an obstruction is north of some parts of an array but is east, south, or west of other parts of the array, the minimal shading criterion shall be determined to the closest point on the array that is west, north, or east of the obstruction. Obstructions that are subject to this criterion include:
 - i. Any vent, chimney, architectural feature, mechanical equipment, or other obstruction that is on the roof or any other part of the building.
 - ii. Any part of the neighboring terrain.
 - iii. Any tree that is mature at the time of installation of the photovoltaic system.
 - iv. Any tree that is planted on the building lot or neighboring lots or planned to be planted as part of the landscaping for the building (the expected shading must be based on the mature height of the tree).
 - v. Any existing neighboring building or structure.
 - vi. Any planned neighboring building or structure that has been approved or, in the opinion of the Building Official, is likely to be approved, for construction.
 - vii. Any telephone or other utility pole that is closer than 30 feet from the nearest point of the array.
- (4) Provides for an interconnection pathway as detailed in 2016 CEC Subchapter 2, Section 110.10, which shall be equipped with conduit or wiring sized to provide solar readiness for any area of the required solar zone not already covered by the installed system.

- (5) Complies with the 2016 Title 24 Building Energy Code without claiming the solar compliance credit described in Section 2.2.3 of the 2016 Title 24, Part 6, Residential Alternative Calculation Method.

(D) OTHER CONSIDERATIONS

- 1) At the earliest feasible time after the prospective purchaser is identified, the developer or builder shall provide the option of an expanded solar photovoltaic system size beyond the minimum mandatory system sizing requirements, up to a size that will fully offset the annual electricity consumption of the building.
- 2) Solar energy systems that are leased by the end-use customer (tenant or owner) or that supply electricity to the end-use customer through a power purchase agreement (PPA) may be used to satisfy the requirement provided the system meets all other requirement criteria.
- 3) To accommodate for future system expansion, the applicant is encouraged to design systems and utilize technologies that minimize the cost of expansion.
- 4) Applicant is encouraged to consider an all-electric building energy system design and to include solar thermal for domestic hot water.
- 5) To further reduce greenhouse gas emissions, the applicant is encouraged to include energy storage.

(E) ALTERNATIVES [OPTIONAL]

- 1) Alternative on-site renewable electric energy systems (other than roof mounted solar energy systems) including ground-mounted solar structures, roof-mounted wind turbines, or ground-mounted wind turbines of equivalent capacity or TDV production, may be substituted for the solar energy generation requirement.
- 2) Energy storage may be substituted for a portion of the required solar photovoltaic capacity such that the system provides an equivalent level of TDV savings.
- 3) Participation in a community solar program that has been specifically approved by the **[Jurisdiction]** as an alternative compliance method for this Ordinance.
- 4) In the case of practical challenges such as building site location, limited rooftop availability, shading from nearby structures, topography or vegetation, or other conditions, the Building Official may waive or reduce the requirement and/or impose the building be designed to meet the CALGreen Tier 1 energy

performance standard as specified under CALGreen section [4.201] and the efficiency requirements of section [A4.203.1.2.2]. **[DOES NOT APPLY TO MULTIFAMILY IN CLIMATE ZONES 3 AND 4].**

- 5) The installation of the required capacity under the prescriptive approach may be reduced if the applicant can demonstrate that the system will generate more electricity than the building, appliances and plug loads will consume over the course of a year.
- 6) Other methods as determined, providing the Building Official finds that the proposed alternative is satisfactory and complies with the intent of this section.

(F) EXCEPTIONS

The Building Official may exempt a covered building from the provisions of this Chapter if she/he determines that there are sufficient practical challenges to make satisfaction of the requirements infeasible. Practical challenges may be a result of the building site location, limited rooftop availability, or shading from nearby structures, topography or vegetation. The applicant is responsible for demonstrating requirement infeasibility when applying for an exception.

(G) REPORTING

[OPTIONAL SECTION]

The **[Jurisdiction]** shall compile statistical data for both approved permits and projects completed, including:

1. Total number of applications subject to the requirements
 - a. Number of applications granted exceptions from the requirements
 - b. Number of compliant applications
 - c. Number of non-compliant applications
2. Total solar capacity required to be installed, in terms of DC nameplate rating
3. Actual solar capacity installed
4. Capacity of storage installed
5. Estimated annual kWh production, based on the National Renewable Energy Laboratory's PVWatts calculator or equivalent
6. Estimated annual avoided GHG emissions and statement of the value of the coefficient used for the calculation

[THE SECTIONS BELOW MAY BE MODIFIED TO CONFORM TO LOCAL FORMS]

(H) CEQA

Staff has determined that the actions contemplated in this ordinance comply with the California Environmental Quality Act (California Public Resources Code Sections 21000 et seq.). Said determination is on file with the City Clerk. The **[Council/Board]** affirms this determination.

(I) APPROVAL BY THE STATE OF CALIFORNIA

[Council/Board] directs staff to submit a copy of this ordinance and any supporting documentation to the California Energy Commission for review and approval.

(J) EFFECTIVE DATES

This ordinance shall be effective thirty (30) days after adoption or upon approval by the California Energy Commission, whichever comes later.

(K) SEVERENCE

If any section, subsection, clause or phrase of this Ordinance is for any reason held to be invalid, such decision shall not affect the validity of the remaining portion or sections of the Ordinance. The **[Council/Board]** hereby declares that it should have adopted the Ordinance and each section, subsection, sentence, clause or phrase thereof irrespective of the fact that any one or more sections, subsections, sentences, clauses or phrases be held invalid.

(L) APPEALS, PENALTIES, REMEDIES

All other procedural matters regarding the administration and execution of these amendments are subject to the processes specified in the Building Code adopted by the **[Jurisdiction]** and amended from time to time as part of the municipal code section **[CITE SECTION]**.